Polymer Matrix Composites using Fused Deposition Modeling Technology, Phase I

Completed Technology Project (2012 - 2013)

Project Introduction

Fused deposition modeling (FDM) is an additive manufacturing technology that allows fabrication of complex three-dimensional geometries layer-by-layer. The goal of the present proposal is to extend FDM technology to create new polymer matrix composites (PMCs) comprising of polymers and inorganic matrices. Innovative design coupled with novel PMCs can be used for cryogenic and high temperature applications. An integrated and automated process based on the FDM technology would facile large-scale manufacturing process of these PMCs. These materials can be used for making robotic components for terrestrial or extra-terrestrial applications, in aviation and defense industries, making turbine blades etc. Coupling the synthetic and cost-effective production approaches, FDM would facilitate making PMCs that can also be used for cryogenic and high temperature applications.

Primary U.S. Work Locations and Key Partners

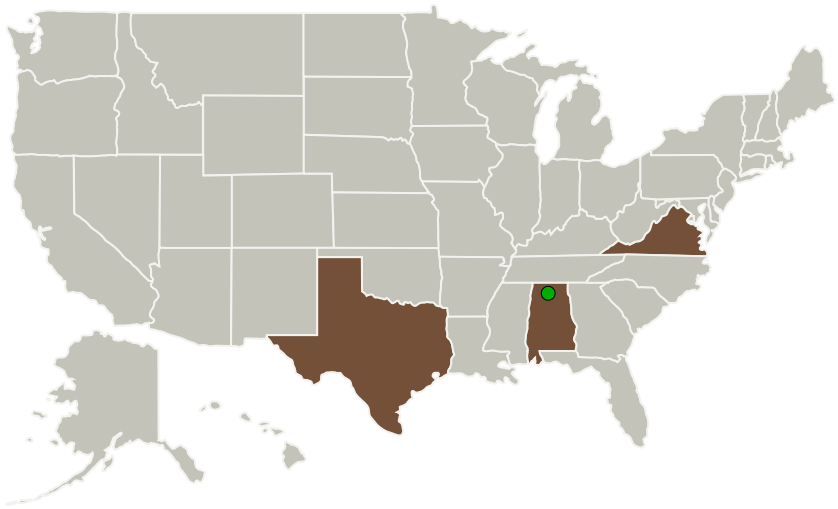

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Table of Contents

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Organizations Performing Work	Role	Type	Location
Materials Modification, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	Fairfax, Virginia
Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama
The University of Texas at El Paso	Supporting Organization	Academia	El Paso, Texas

Primary U.S. Work Locations	
Alabama	Texas
Virginia	

Project Transitions

February 2012: Project Start

February 2013: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138415)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Materials Modification, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

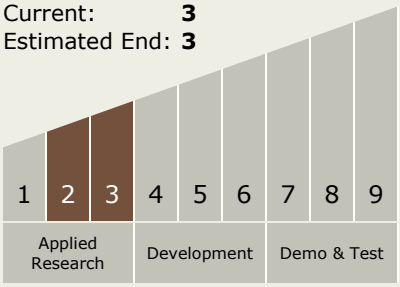
Carlos Torrez

Principal Investigator:

Kausik Mukhopadhyay

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.4 Manufacturing
    - TX12.4.1 Manufacturing Processes

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System